

ABSTRACT

A DNA enzyme having the RNA cleavage activity significantly improved as compared with those of known DNA enzymes and a method for controlling the activity, the method being capable of reversibly controlling the RNA cleavage activity of the DNA enzyme by light irradiation, are provided.

The DNA enzyme includes a nucleotide residue, to which any one organic group selected from the group consisting of azobenzene, spiropyran, stilbene, and derivatives thereof is bonded, at a 3'-side end of a catalytically active loop of the DNA enzyme. The method for controlling the activity includes the step of applying light at specific wavelengths to the DNA enzyme including a nucleotide residue, to which any one organic group selected from the group consisting of azobenzene, spiropyran, stilbene, and derivatives thereof is bonded, and thereby, effecting reversible structural isomerization between a planar structure and a nonplanar structure of the organic group, so as to control the RNA cleavage activity of the DNA enzyme.